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(54) BONDED STRUCTURE OF ELECTRONIC COMPONENT AND ITS ADHESIVE BONDING

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a highly reliable bonded structure of an electronic component, having capability for rebonding the electronic component which has been bonded to a circuit-board, and to provide a method for bonding the electronic component to the circuit-board.
SOLUTION: This bonded structure of an electronic component comprises the electronic component having electrodes and a circuit-board faced to the electrodes through an adhesive layer. Therein, the adhesive layer comprises an acrylic polymer, a cationic polymerizable compound, a photo-cationic polymerization initiator and electrically conducting particles. When the electronic component having the electrodes is bonded to the circuit board faced to the electrodes, the adhesive layer is laminated to the surface of either of the electronic component and the circuit board and subsequently irradiated with light.

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(54)【発明の名称】　電子部品の接合構造体及び接合方法

(57)【要約】
【課題】回路基板に接合された電子部品の再接合が可能であり、信頼性の高い電子部品の接合構造体及び接合方法を提供する。
【解決手段】　電極を有する電子部品と、該電極に対面する回路基板が粘着層を介して接合された接合構造であって、上記粘着層が、アクリル系ポリマー、カチオン重合性化合物、光カチオン重合開始剤、及び導電性粒子からなる。

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【特許請求の範囲】

【請求項１】　電極を有する電子部品と、該電極に対面する回路基板が粘着層を介して接合された接合構造であって、上記粘着層が、アクリル系ポリマー、カチオン重合性化合物、光カチオン重合開始剤、及び導電性粒子からなることを特徴とする電子部品の接合構造体。

【請求項２】　電極を有する電子部品と、該電極に対面する回路基板を接合する際、電子部品又は回路基板のいずれか一方の面に請求項１に記載の粘着層を積層し、その際、該粘着層に光を照射することを特徴とする電子部品の接合方法。

【請求項３】　粘着層がシート状物である請求項２記載の接合方法。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、回路基板の回路パターンと電子部品の電極との間に異方導電性を有する粘着層を介した電子部品の接合構造体及び接合方法に関する。

【０００２】

【従来の技術】従来より、回路基板の回路パターンにＩＣチップなどの電子部品を接合するための技術として、例えば、図３の断面図で示すような特開平８－１３８７７３号公報に記載の電極部構造がある。この電極部の接続構造は、電子部品４と対向する回路基板２とを導電性粒子６ａが分散された接着剤層６ｂからなる異方性導電材料６を介して加熱圧着し、回路パターンの銅配線１と電子部品４の電極５間を導電接続する方法で行われていた。しかし、上記公報に記載の方法によると、回路パターンの銅配線１と電子部品４の電極５との接続部分を加熱圧着状態で固着するので、固着後に接続不良が発生した場合に電子部品４を剥離したり再接着することが困難であり、このため不良品が増えて生産性を低下させる原因となっていた。

【０００３】また、急速な加熱を行うと接着剤樹脂の粘度が急激に低下して接合領域外へ流出して接合不良の原因となり、また、電子部品と回路基板との熱膨張率の差により、硬化後に電子部品と回路基板との間でそりが生じ、冷熱サイクルで電極間の接合が破壊されて導電接続の信頼性が失われるという結果になる。

【０００４】

【発明が解決しようとする課題】本発明は上記従来の問題点を解消し、回路基板に接合された電子部品の再接合が可能であり、信頼性の高い電子部品の接合構造体及び接合方法を提供することを目的とする。

【０００５】

【課題を解決するための手段】本発明の電子部品の接合構造体は、電極を有する電子部品と、該電極に対面する回路基板が粘着層を介して接合された接合構造であって、上記粘着層が、アクリル系ポリマー、カチオン重合

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性化合物、光カチオン重合開始剤、及び導電性粒子からなることを特徴とするものである。

【０００６】又、本発明の電子部品の接合方法は、電極を有する電子部品と、該電極に対面する回路基板を接合する際、電子部品又は回路基板のいずれか一方の面に請求項１に記載の粘着層を積層し、その際、該粘着層に光を照射することを特徴とする。

【０００７】本発明でいう電極を有する電子部品とは、半導体実装分野で用いられているＩＣチップに金、銀、銅、ニッケル、鉛、錫あるいはこれらの合金からなる電極が形成されたものである。また、回路基板とはＩＣチップが接合される面に電極が設けられたものであり、ガラスエポキシ基板等のリジッド回路基板、ポリイミドフィルム基板等のフレキシブル回路基板を指す。

【０００８】請求項１に記載の発明で、粘着層として耐候性及び粘着性に優れるアクリル系ポリマーが用いられる。アクリル系ポリマーはカチオン重合性化合物、光カチオン重合開始剤及び導電性粒子と混合して粘着剤とした場合に十分な凝集力を示しかつ粘着性を発現し得るものであり、少なくとも（メタ）アクリル酸エステルからなる単独重合体、２種以上の（メタ）アクリル酸エステルからなる共重合体、（メタ）アクリル酸エステル及びこれに共重合可能な不飽和結合を有するビニルモノマーとの共重合体などを用いることができる。使用する光硬化性樹脂、重合開始剤及び導電性粒子に応じて適宜選択すればよく、これらを２種以上併用してもよい。ここで、（メタ）アクリルとは、アクリル及びメタアクリルを総称する表現として用いることとする。

【０００９】アクリル系ポリマーはカチオン重合性化合物と相溶性を有するものであってもよく、あるいは相溶性を有しないものであってもよく、マクロ相分離を起さないものである限りその分子量は大きいものほど好ましい。ここでマクロ相分離とは、アクリル系ポリマーとカチオン重合性化合物とが完全に相分離する現象であって、アクリル系ポリマーまたはカチオン重合性化合物のいずれか一方または双方が透明性を有する状態で分離することを指し、ミクロ相分離により単に白濁した状態とは異なる状態である。

【００１０】アクリル系ポリマーの分子量は大きい方が好ましいが、特に、重量平均分子量が２０万～５００万程度のものが好ましい。重量平均分子量が２０万未満の場合、粘着層の凝集力が不足して貼り付け時に糸引きを生じ、剥離することがある。重量平均分子量が５００万を超えると高分子と光硬化性樹脂とを含む組成物の粘度が高くなり粘着層が成形され難くなる。

【００１１】請求項１に記載の発明におけるカチオン重合性化合物は光を照射することにより硬化する樹脂である。光照射後の硬化反応性に優れているために、１分子中に少なくとも１つのカチオン重合性基を有する樹脂が用いられる。１分子中に少なくとも１つのカチオン重合

性基を有する樹脂としては、例えば、ビニルエーテル系樹脂やエポキシ系樹脂などを挙げることができるが、硬化後の接着性、耐候性、耐薬品性及び耐熱性に優れている点で、エポキシ樹脂が好ましい。

【００１２】ビニルエーテル系樹脂としては、ウレタンビニルエーテル、ポリエステルビニルエーテル、多官能性ビニルエーテルオリゴマーなどから選ばれる樹脂中にビニロキシ基を有するものが挙げられ、エポキシ樹脂としては、例えば、ビスフェノールＡ型エポキシ樹脂、水添ビスフェノールＡ型エポキシ樹脂、ビスフェノールＦ型エポキシ樹脂、ノボラック型エポキシ樹脂、脂肪族環式エポキシ樹脂、臭素化エポキシ樹脂、ゴム変成エポキシ樹脂、ウレタン変成エポキシ樹脂、グリシジルエステル系化合物、エポキシ化大豆油、エポキシ化エラストマーなどを挙げることができ、これらは複数種併用してもよい。

【００１３】光カチオン重合開始剤としては、光の照射により活性化され、カチオン重合を誘発し得る化合物である限り特に限定されるものではない。好ましくは、２０～１００℃付近では熱触媒活性の低い化合物が貯蔵安定性を高める上で好ましい。このような好ましい光カチオン重合開始剤としては、例えば、鉄－アレン錯体化合物、芳香族ジアゾニウム塩、芳香族ヨードニウム塩、芳香族スルホニウム塩、ピリジニウム塩などが挙げられる。

【００１４】より具体的には、例えば、オプトマーＳＰ－１５０（旭電化工業社製）、オプトマーＳＰ１５１（旭電化工業社製）、オプトマーＳＰ１７１（旭電化工業社製）、オプトマーＳＰ－１７０（旭電化工業社製）、ＵＶＥ－１０１４（ゼネラルエレクトロニクス社製）、ＣＤ－１０１２（サートマー社製）、サンエイドＳＩ－６０Ｌ（三新化学工業社製）、サンエイドＳＬ－８０Ｌ（三新化学工業社製）、サンエイドＳＩ－１００Ｌ（三新化学工業社製）、ＣＩ－２０６４（日本曹達社製）、ＣＩ－２６３９（日本曹達社製）、ＣＩ－２６２４（日本曹達社製）、ＣＩ－２４８１（日本曹達社製）、RHODORSIL PHOTOINITIATOR 2074（ローヌ・ローラン社製）などの市販の化合物及びその溶液を用いることができる。

【００１５】光カチオン重合開始剤は複数種併用してもよく、さらに、重合を促進するために、光増感剤、例えばチオキサンソン誘導体化合物を適宜組み合わせて用いてもよい。

【００１６】請求項１に記載の発明において、導電性粒子はアクリル系ポリマー、カチオン重合性化合物及び光カチオン重合開始剤からなる組成物中に分散されている。この場合、分散の態様は電子部品電極と回路基板電極との導通性、隣接電極間の絶縁性、即ち異方導電性を発揮させ得るものである限り限定されない。通常、導電性粒子の粒径をシートの厚みより大きくして異方導電性を発揮させるので、この場合には隣接する導電性粒子が直接接触しない限り、面方向において絶縁を確保し得る。なお、粒径についても接続すべき回路パターンやピッチに応じて適宜選択すればよい。

【００１７】導電性粒子としては、例えば、金、銀、銅、ニッケル、パラヂウム、白金、コバルト、ロジウム、イリジウム、鉄、ルテニウム、オスミウム、アルミニウム、亜鉛、錫、鉛などの適宜の金属を粒子状としたもの、上記金属の合金を粒子状としたもの、酸化錫などの金属酸化物を粒子状としたもの、カーボンなどの導電性炭素同素体を粒子状としたもの、ガラス、カーボン、マイカ、プラスチックなどの絶縁性粒子の表面に導電性金属をコーティングしたものなどを挙げることができ、特に限定されない。また、２種以上の導電性粒子を併用してもよい。更に、粒子の分散性をよくするために、粒子表面に適当な処理を施すことも可能である。

【００１８】導電性粒子の平均粒径は特に限定はされないが１～２０μmの範囲とすることが望ましい。１μm未満では導電性粒子同士の凝集力が著しくなり、粘着層の形成に際し導電性粒子を均一に分散させることが困難となることがあり、２０μmを超えると、微細な回路の線間が狭くなった場合に短絡を引き起こす可能性が大きくなる。

【００１９】粘着層の形成方法

本発明の電子部品の接合方法で粘着層を形成する方法は、既知のキャスティング法、ホットメルト塗工法、ＵＶ塗工重合法等を用いることができる。例えば、キャスティング法では、高分子、光硬化性樹脂、重合開始剤を溶剤に溶解し、さらに、導電性粒子を分散させ、得られた溶液を離型処理したフィルム上にキャストし、乾燥することにより形成することができる。

【００２０】ホットメルト塗工法では、高分子、光硬化性樹脂、重合開始剤を加熱混合し、さらに、導電性粒子を分散させてなる組成物をホットメルト塗工すればよい。

【００２１】ＵＶ塗工重合法では、アクリル系ポリマーを構成するためのアクリル系モノマーを含むモノマー成分と、カチオン重合性化合物と、光カチオン重合開始剤と、上記アクリル系モノマー成分を光ラジカル重合するためのラジカル重合触媒とを混合し、さらに導電性粒子を分散する。上記組成物を接合部に塗工し、光カチオン重合開始剤を活性化せずにラジカル重合触媒を活性化し、アクリル系ポリマーを得て粘着層とする。この場合、導電性粒子を均一に分散させ、且つ安定化するために、塗工前の組成物には重合で得られるアクリル系ポリマーの他に、他のポリマーを添加しておいてもよい。

【００２２】接合方法

本発明による電子部品の接合方法は、まず、電極が形成された回路基板の接合面に、予め貼り合わせる大きさに合わせた粘着層を貼り付ける。次に、カチオン重合性化

合物が感光する波長を含む光を照射してカチオン重合性化合物の重合を開始する。この後粘着性を保持した状態で集積回路等の電子部品を貼り合わせ、室温下で所定の時間養生することにより硬化を完了させる。しかし、貼り合わせる際に作業性の簡便性からみて電子部品に粘着層を貼り合わせることも可能である。

【００２３】硬化に使用する光は使用する光カチオン重合開始剤に応じて選ばれ、特に限定されるわけではないが、好ましくは、２００～８００ｎｍの波長の成分を含む光が用いられる。２００ｎｍ未満の波長の光を照射した場合にはカチオン重合性化合物の表層のみが硬化して貼り合わせ時に粘着力を発揮せず、電気部品同士を接合できないことがある。８００ｎｍを超える光を照射した場合には十分なエネルギーを重合開始剤に与え難く、カチオン重合性化合物を硬化させることが困難となることがある。より好ましくは、光源の取り扱いが容易であるため３００～５００ｎｍの範囲の波長の光が用いられる。

【００２４】（作用）本発明の電子部品の接合構造によると、接合のためにアクリル系ポリマーと、カチオン重合性化合物と、光カチオン重合開始剤からなる粘着層を用いるので、接続不良時に剥離し、再接合することができる。これにより不良品の発生を抑えることができる。

【００２５】又、本発明の接合方法によると、請求項１記載の粘着層を使用した光硬化による接合であるから電子部品と回路基板との熱膨張率の差によるそりが起こらず、硬化後は界面で強く接着され接合の信頼性が高くなる。更に、急速な加熱を行わないので初期接合時に接合部以外へ粘着層が流出することなく硬化させることができる。

【００２６】

【発明の実施の形態】以下、本発明の実施例を説明する。

（実施例１）２Ｌセパラブルフラスコ中で、高分子としてエチルアクリレート（ＥＡ）とグリシジルメタクリレート（ＧＭＡ）との共重合体（重量平均分子量７０万、組成比：ＥＡ／ＧＭＡ＝８／２（重量比））１００ｇと、光硬化性樹脂としてエポキシ樹脂（油化シェルエポキシ社製、商品名：エピコート８２８）１００ｇと、光カチオン重合開始剤（旭電化工業社製、商品名：オプトマーＳＰ－１７０）１．０ｇと、導電性粒子としてニッケル粉（平均粒径１５μｍ）４０ｇとを酢酸エチル３００ｇ中で均一となるまで攪拌溶解して粘着層を得た。

【００２７】得られた粘着層を、表面が離型処理されたポリエチレンテレフタレート（ＰＥＴ）フィルムに乾燥後の厚みが２０μｍとなるように塗工して粘着シートを作製した。

【００２８】性能評価

（１）再接着性

厚み５０μｍのポリイミドフィルム上に２００μｍのピッチで銅配線パターンが形成されているフレキシブルプリント基板（ＦＰＣ）に、上記粘着シートの粘着層を転写して該粘着層面にＩＣチップを接着した。その後ＩＣチップを剥離したところ、ＩＣチップは完全に界面剥離し再接着可能な状態であった。

【００２９】（２）接着力

上記ＦＰＣに粘着シートを貼り合わせ、ＰＥＴフィルム側から高圧水銀灯で７５０ｍｊ／ｃｍ^2 の強度で紫外線を照射した。その後ＰＥＴフィルムを剥離し、ＩＣチップを３０ｋｇｆ／ｃｍ^2 の圧力で圧着することにより接合し、紫外線照射から７日間２５℃の温度で養生した。この接合体をＦＰＣの幅１０ｍｍにつき剥離速度５０ｍｍ／分で１８０度剥離したときの剥離強度を測定して接着力とした。この結果、接着力は１．３１ｋｇｆ／１０ｍｍであり、充分な接着力であることが判った。

【００３０】（３）接続抵抗

図１及び図２に示すように、一方の面に接続部分が２００μｍピッチで互いに平行な銅配線１，１の配線パターンが形成されているフレキシブルプリント回路基板（ＦＰＣ）２を２枚用意し、ＦＰＣ２，２の互いの配線パターンが形成されている面同士を対向させ、上記粘着シートに形成した粘着層３を用いて貼り合わせた。なお、破線で示す銅配線１は下面に形成されていることを示す。この場合、貼り合わせにより得られた接合体の端部間の抵抗値ａ、すなわち一方のＦＰＣ上の銅配線パターンの接合部分とは反対側の端部と、他方のＦＰＣ２における銅配線パターンの接合部分と反対側の端部との間の抵抗値と、隣合っている配線パターン間の抵抗値ｂとを測定した。

【００３１】その結果、この接合体は、対向する配線間の抵抗値は３．２Ω、隣接配線間の抵抗値は１０００Ω以上であり、通常の異方性導電膜として用いられている異方導電性を有するものであった。

【００３２】（比較例１）市販の異方性導電膜（ソニーケミカル社製，商品名「ＣＰ７６２１」）を使用して実施例１で用いたものと同じＦＰＣとＩＣチップを接合した。接合は１６０℃の温度と２５０ｋｇｆ／ｃｍ^2 の圧力で行った。その結果、両者は完全に接合され、剥離して再接合することは不可能であった。

【００３３】

【発明の効果】本発明の電子部品の接合構造体によると、回路基板に接合された電子部品の接合不良時に剥離でき、再接着することができる。これにより不良品の発生を抑えることができる。また、通常の異方性導電膜として用いられている異方導電性を有するものであり、半導体の実装に用いられる電子部品の接合構造として好適に用いられる。また、本発明の電子部品の接合方法によると、光硬化による接合であるから電子部品と回路基板との熱膨張率の差によるそりが起こらず、硬化後は界面で強く接着されるので信頼性の高い接合構造体が得られ

る。

【図面の簡単な説明】

【図１】実施例１で得た粘着剤の接着力評価で用いた２枚のＦＰＣの接合体を説明するための平面図。

【図２】図１の側面図。

【図３】従来の接合構造の例を示す断面図。

【符号の説明】

１：銅配線

２：回路基板

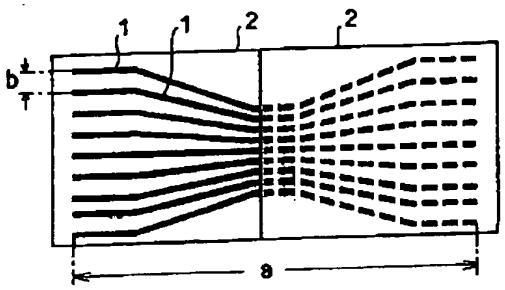
３：粘着層

４：電子部品

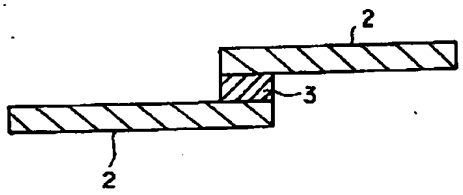
５：電極

６：異方性導電材料

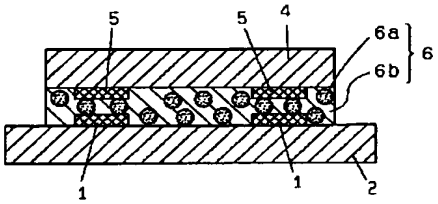
【図１】



【図２】



【図３】



フロントページの続き

Ｆターム(参考)　4J004 AA08 AA10 AA13 AA17 AA18
AA19 AB07 BA02 DB03 FA05
4J040 DF041 DF051 EC061 EC071
EC151 EC211 EC241 EC261
EC281 EC371 EC401 FA271
FA291 HA026 HA066 HA076
HA136 HA346 HA356 HB06
HC14 HC22 HD18 HD43 JA09
JB09 KA03 KA07 KA13 KA32
LA01 MB05 NA20 PA32
5E051 CA03
5E319 BB13 BB16 CC61 CD57

CLAIMS

[Claim(s)]

[Claim 1] The junction structure of the electronic parts which have an electrode, and the electronic parts with which it is the junction structure where the circuit board which meets this electrode was joined through the adhesive layer, and the above-mentioned adhesive layer is characterized by the bird clapper from acrylic polymer, a cationic polymerization nature compound, an optical cationic initiator, and a conductive particle.

[Claim 2] The junction method of the electronic parts which carry out the laminating of the adhesive layer according to claim 1 to the field of either electronic parts or the circuit board, and are characterized by irradiating light at this adhesive layer in that case in case the circuit board which meets this electrode is joined to the electronic parts which have an electrode.

[Claim 3] The junction method according to claim 2 that an adhesive layer is a sheet-like object.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the junction structure and the junction method of electronic parts which minded the adhesive layer which has different direction conductivity between the circuit pattern of the circuit board, and the electrode of electronic parts.

[0002]

[Description of the Prior Art] conventionally, the polar-zone structure which is a publication is for example, in a publication-number No. 138773 [eight to] official report as shown with the cross section of drawing 3 as technology for joining electronic parts, such as IC chip, to the circuit pattern of the circuit board The connection structure of this polar zone carried out heating sticking by pressure of electronic parts 4 and the circuit board 2 which counters through the anisotropy electrical conducting material 6 which consists of adhesives layer 6b by which conductive particle 6a was distributed, and was performed by the method of connecting between the electrodes 5 of electronic parts 4 conductively to the copper wiring 1 of a circuit pattern. However, according to the method given in the above-mentioned official report, since a part for the connection of the copper wiring 1 of a circuit pattern and the electrode 5 of electronic parts 4 was fixed in the state of heating sticking by pressure, when a faulty connection occurred after fixing, electronic parts 4 were exfoliated, and it is difficult to re-paste up and had become the cause by which a defective increased for this reason and productivity was reduced.

[0003] Moreover, if rapid heating is performed, the viscosity of an adhesives resin will fall rapidly, will flow out out of a junction field, and will become the cause that junction is poor, and the result that a warp arises between electronic parts and the circuit board after hardening, junction inter-electrode in a cold energy cycle is destroyed by the difference of the coefficient of thermal expansion of electronic parts and the circuit board, and the reliability of conductive connection is lost according to it is brought.
[0004]
[Problem(s) to be Solved by the Invention] this invention cancels the above-mentioned conventional trouble, and re-junction of the electronic parts joined to the circuit board is possible, and it aims at offering the junction structure and the junction method of reliable electronic parts.
[0005]
[Means for Solving the Problem] The junction structure of the electronic parts of this invention is the junction structure where the circuit board which meets this electrode was joined to the electronic parts which have an electrode through the adhesive layer, and the above-mentioned adhesive layer is characterized by the bird clapper from acrylic polymer, a cationic polymerization nature compound, an optical cationic initiator, and a conductive particle.
[0006] Moreover, in case the junction method of the electronic parts of this invention joins the circuit board which meets this electrode to the electronic parts which have an electrode, it carries out the laminating of the adhesive layer according to claim 1 to the field of either electronic parts or the circuit board, and is characterized by irradiating light at this adhesive layer in that case.
[0007] With the electronic parts which have an electrode as used in the field of this invention, the electrode which consists of gold, silver, copper, nickel, lead, tin, or these alloys is formed in IC chip used in the semiconductor mounting field. Moreover, an electrode is prepared in the field where IC chip is joined, and the circuit board points out the flexible circuit boards, such as the rigid circuit boards, such as a glass epoxy-group board, and a polyimide film substrate.
[0008] By invention according to claim 1, the acrylic polymer which is excellent in weatherability and adhesiveness as an adhesive layer is used. When it mixes with a cationic polymerization nature compound, an optical cationic initiator, and a conductive particle and is made into a binder, acrylic polymer shows sufficient cohesive force, and may discover adhesiveness, and it can use a copolymer with the vinyl monomer which has the unsaturated bond which can be copolymerized in the homopolymer which consists of an acrylic ester at least (meta), the copolymer which consists of two or more sorts of acrylic esters (meta), an acrylic ester (meta), and this etc. You may use together two or more sorts of these that what is necessary is just to choose suitably according to the photoresist, the polymerization initiator, and the conductive particle to be used. Here, suppose that it uses as expression which names an acrylic and a meta-acrylic generically with an acrylic (meta).
[0009] Unless you may not have a cationic polymerization nature compound and compatibility, and you may not have compatibility or macro phase separation is started, the molecular weight of a larger thing is [acrylic polymer] more desirable. Macro phase separation is a phenomenon in which acrylic polymer and a cationic polymerization nature compound carry out phase separation completely, and the state where pointed out dissociating in the state where either or the both sides of acrylic polymer or a cationic polymerization nature compound has transparency, and it only became cloudy by micro phase separation is in a different state here.
[0010] Although the molecular weight of acrylic polymer has the desirable larger one, that whose weight average molecular weight is 200,000 to about 5 million is desirable especially.

When weight average molecular weight is less than 200,000, the cohesive force of an adhesive layer is insufficient, it may stick, a cobwebbing may sometimes be produced, and it may exfoliate. If weight average molecular weight exceeds 5 million, the viscosity of the constituent containing a macromolecule and a photoresist will become high, and an adhesive layer will become is hard to be fabricated.

[0011] The cationic polymerization nature compound in invention according to claim 1 is a resin hardened by irradiating light. Since it excels in the hardening reactivity after optical irradiation, the resin which has at least one cationic polymerization nature machine is used into 1 molecule. Although a vinyl ether system resin, an epoxy system resin, etc. can be mentioned into 1 molecule as a resin which has at least one cationic polymerization nature machine, for example, it is a point excellent in the adhesive property, the weatherability, chemical resistance, and thermal resistance after hardening, and an epoxy resin is desirable.

[0012] As a vinyl ether system resin, urethane vinyl ether, polyester vinyl ether, What has a BINIROKISHI machine is mentioned into the resin chosen from polyfunctional vinyl ether oligomer etc. as an epoxy resin For example, the bisphenol A type epoxy resin, a hydrogenation bisphenol A type epoxy resin, A bisphenol female mold epoxy resin, a novolak type epoxy resin, an aliphatic ring type epoxy resin, A bromination epoxy resin, a rubber conversion epoxy resin, an urethane conversion epoxy resin, a glycidyl ester system compound, epoxidation soybean oil, an epoxidation elastomer, etc. can be mentioned, and two or more sorts of these may be used together.

[0013] As an optical cationic initiator, irradiation of light is activated, and especially as long as it is the compound which may induce cationic polymerization, it is not limited. Preferably, near 20-100 degree C, when the low compound of heat catalytic activity raises storage stability, it is desirable. As such a desirable optical cationic initiator, an iron-allene complex compound, aromatic diazonium salt, an aromatic iodonium salt, aromatic sulfonium salt, a pyridinium salt, etc. are mentioned, for example.

[0014] More specifically For example, OPUTOMA SP-150 (Asahi Denka Kogyo K.K. make), OPUTOMA SP 151 (Asahi Denka Kogyo K.K. make), OPUTOMA SP 171 (Asahi Denka Kogyo K.K. make) OPUTOMA SP-170 (Asahi Denka Kogyo K.K. make), UVE-1014 (general electronics company make), CD-1012 (Sartomer make), SANEIDO SI-60L (3 Japanese Federation of Chemical Industry Workers' Unions industrial company make), SANEIDO SL-80L (3 Japanese Federation of Chemical Industry Workers' Unions industrial company make), SANEIDO SI-100L (3 Japanese Federation of Chemical Industry Workers' Unions industrial company make), CI-2064 (Nippon Soda Co., Ltd. make), CI-2639 (Nippon Soda Co., Ltd. make), The compound of marketing, such as CI-2624 (Nippon Soda Co., Ltd. make), CI-2481 (Nippon Soda Co., Ltd. make), and RHODORSIL PHOTOINITIATOR 2074 (made in RONU Roland), and its solution can be used.

[0015] Two or more sorts of optical cationic initiators may be used together, and further, in order to promote a polymerization, you may use them, combining a photosensitizer, for example, a thioxanthone derivative compound, suitably.

[0016] In invention according to claim 1, the conductive particle is distributed in the constituent which consists of acrylic polymer, a cationic polymerization nature compound, and an optical cationic initiator. In this case, the mode of distribution is not limited as long as the conductivity of an electronic-parts electrode and a circuit board electrode and contiguity inter-electrode insulation, i.e., different direction conductivity, may be demonstrated. Usually, since particle size of a conductive particle is made larger than the thickness of a sheet and different direction

conductivity is demonstrated, unless the conductive particle which adjoins in this case contacts directly, an insulation can be secured in the direction of a field. In addition, what is necessary is just to choose suitably according to the circuit pattern and pitch which should connect also about particle size.

[0017] As a conductive particle, for example Gold, silver, copper, nickel, palladium, Platinum, cobalt, a rhodium, iridium, iron, a ruthenium, an osmium, What made proper metals, such as aluminum, zinc, tin, and lead, the shape of a particle, What made metallic oxides which made the alloy of the above-mentioned metal the shape of a particle, such as a thing and a tin oxide, the shape of a particle, What coated the conductive metal can be mentioned to the front face of insulating particles, such as what made conductive carbon allotropes, such as carbon, the shape of a particle, glass, carbon, a mica, and plastics, and it is not especially limited to it. Moreover, you may use together two or more sorts of conductive particles. Furthermore, in order to improve the dispersibility of a particle, it is also possible to perform suitable processing for a particle front face.

[0018] Although the mean particle diameter of a conductive particle is not carried out, it is [especially limitation] desirable to consider as the range which is 1-20 micrometers. In less than 1 micrometer, when the cohesive force of conductive particles became remarkable, there is a bird clapper that it is difficult to distribute a conductive particle uniformly on the occasion of formation of an adhesive layer, it exceeded 20 micrometers and between the lines of a detailed circuit becomes narrow, possibility of causing a short circuit becomes large.

[0019] The known casting method, a hot-melt coating method, UV coating polymerization method, etc. can be used for the method of forming an adhesive layer by the junction method of the electronic parts of the formation method this invention of an adhesive layer. For example, by the casting method, a macromolecule, a photoresist, and a polymerization initiator are dissolved in a solvent, and further, a conductive particle can be distributed, the cast of the obtained solution can be carried out on the film which carried out mold release processing, and it can form by drying.

[0020] What is necessary is to carry out heating mixture of a macromolecule, a photoresist, and the polymerization initiator, and just to carry out hot-melt coating of the constituent which makes it come to distribute a conductive particle further by the hot-melt coating method.

[0021] By UV coating polymerization method, the monomer component containing the acrylic monomer for constituting acrylic polymer, a cationic polymerization nature compound, an optical cationic initiator, and the radical polymerization catalyst for carrying out the optical radical polymerization of the above-mentioned acrylic monomer component are mixed, and a conductive particle is distributed further. Coating of the above-mentioned constituent is carried out to a joint, and radical polymerization catalyst is activated without activating an optical cationic initiator, acrylic polymer is obtained, and it considers as an adhesive layer. In this case, in order to distribute uniformly and stabilize a conductive particle, to the constituent in front of coating, you may add other polymer besides the acrylic polymer obtained by the polymerization.

[0022] The junction method of the electronic parts by the junction method this invention sticks the adhesive layer doubled with the size first stuck on the plane of composition of the circuit board in which the electrode was formed beforehand. Next, the light containing the wavelength which a cationic polymerization nature compound exposes is irradiated, and the polymerization of a cationic polymerization nature compound is started. Hardening is made to complete, when lamination carries out where adhesiveness is held after this, and predetermined carries out the time regimen of the electronic parts, such as an integrated circuit, under a room temperature.

However, in case it sticks, it is also possible to stick an adhesive layer on electronic parts, in view of the simple nature of workability.
[0023] Although the light used for hardening is not chosen according to the optical cationic initiator to be used and it is not necessarily limited especially, the light containing a component with a wavelength of 200-800nm is used preferably. When light with a wavelength of less than 200nm is irradiated, only the surface of a cationic polymerization nature compound may harden, adhesion may not be demonstrated at the time of lamination, and electrical parts may be unable to be joined. When the light exceeding 800nm is irradiated, it is hard to give sufficient energy to a polymerization initiator, and there is a bird clapper that it is difficult to stiffen a cationic polymerization nature compound. More preferably, since the handling of the light source is easy, the light of the wavelength of the range which is 300-500nm is used.
[0024] (Operation) According to the junction structure of the electronic parts of this invention, since the adhesive layer which serves as acrylic polymer and a cationic polymerization nature compound from an optical cationic initiator is used for junction, it can exfoliate and re-join at the time of a faulty connection. Thereby, generating of a defective can be suppressed.
[0025] Moreover, according to the junction method of this invention, since it is junction by optical hardening which used the adhesive layer according to claim 1, the warp by the difference of the coefficient of thermal expansion of electronic parts and the circuit board does not happen, but after hardening, it pastes up strongly by the interface and the reliability of junction becomes high. Furthermore, it can be made to harden, without an adhesive layer flowing out except a joint at the time of initial junction, since rapid heating is not performed.
[0026]
[Embodiments of the Invention] Hereafter, the example of this invention is explained.
In 2L separable flask, as a macromolecule, 100g (weight average molecular weight 700,000, composition ratio:EA/GMA= 8/2 (weight ratio)) of copolymers of ethyl acrylate (EA) and glycidyl methacrylate (GMA), (Example 1) As a photoresist, 100g (oil-ized shell epoxy company make, tradename:Epicoat 828) of epoxy resins, To 1.0g (the Asahi Denka Kogyo K.K. make, tradename:OPUTOMA SP-170) of optical cationic initiators, as a conductive particle, the stirring dissolution of the 40g (15 micrometers of mean particle diameters) of the nickel powder was carried out until it became uniform in 300g of ethyl acetate, and the adhesive layer was obtained with them.
[0027] Coating was carried out and the pressure sensitive adhesive sheet was produced so that the thickness after drying the obtained adhesive layer on the polyethylene-terephthalate (PET) film with which mold release processing of the front face was carried out might be set to 20 micrometers.
[0028] The adhesive layer of the above-mentioned pressure sensitive adhesive sheet was imprinted to the flexible printed circuit board (FPC) by which the copper circuit pattern is formed in the 200-micrometer pitch on the polyimide film with a performance-evaluation (1) re-adhesive property thickness of 50 micrometers, and IC chip was pasted up on it in this adhesive layer side. When IC chip was exfoliated after that, interfacial peeling of the IC chip was carried out completely, and it was in the state in which re-adhesion is possible.
[0029] (2) It is a pressure sensitive adhesive sheet to the adhesive strength above FPC at a lamination side and a PET film side to a high pressure mercury vapor lamp 750 mj/cm2 Ultraviolet rays were irradiated by intensity. A PET film is exfoliated after that and it is IC chip 30 kgf/cm2 It joined by being stuck by pressure by the pressure, and a himself was recuperated at the temperature of 25 degrees C for seven days from UV irradiation. The peel strength when

exfoliating this zygote 180 degrees in a part for 50mm/in ablation speed per width of face of 10mm of FPC was measured, and it considered as adhesive strength. Consequently, adhesive strength is 1.31kgf(s) / 10mm, and it turns out that it is sufficient adhesive strength.
[0030] (3) As shown in connection resistance drawing 1 and drawing 2 , the amount of connection makes the fields in which two flexible printed circuit substrates (FPC) 2 in which the circuit pattern of the parallel copper wiring 1 and 1 is mutually formed in 200-micrometer pitch are prepared for, and the mutual circuit pattern of FPC 2 and 2 is formed counter one field, and it stuck using the adhesive layer 3 formed in the above-mentioned pressure sensitive adhesive sheet. In addition, it is shown that the copper wiring 1 shown with a dashed line is formed in an inferior surface of tongue. In this case, the resistance between the edge of an opposite side and the edge of the part for a joint and the opposite side of a copper circuit pattern in FPC2 of another side and the resistance b between ********** circuit patterns were measured in a part for the joint of the resistance a between the edges of the zygote obtained by lamination, i.e., the copper circuit pattern on one FPC.
[0031] Consequently, the resistance between 3.2 ohms and contiguity wiring was 1000ohms or more, and the resistance during the wiring with which this zygote counters was what has the different direction conductivity used as a usual anisotropy electric conduction film.
[0032] (Example 1 of comparison) IC chip was joined to the same FPC as what was used in the example 1 using the commercial anisotropy electric conduction film (the Sony Chemicals Corp. make, tradename "CP7621"). Junction is the temperature of 160 degrees C, and 250 kgf/cm2. It carried out by the pressure. Consequently, it was impossible for both to have been joined completely, and to have exfoliated and re-joined.
[0033]
[Effect of the Invention] According to the junction structure of the electronic parts of this invention, it can exfoliate at the time of poor junction of the electronic parts joined to the circuit board, and can re-paste up. Thereby, generating of a defective can be suppressed. Moreover, it has the different direction conductivity used as a usual anisotropy electric conduction film, and is suitably used as junction structure of the electronic parts used for mounting of a semiconductor. Moreover, according to the junction method of the electronic parts of this invention, since it is junction by optical hardening, the warp by the difference of the coefficient of thermal expansion of electronic parts and the circuit board does not happen, but since after hardening is strongly pasted up by the interface, the reliable junction structure is obtained.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The plan for explaining the zygote of FPC of two sheets used by adhesive strength evaluation of the binder obtained in the example 1.
[Drawing 2] The side elevation of drawing 1 .
[Drawing 3] The cross section showing the example of the conventional junction structure.
[Description of Notations]
1: Copper wiring
2: Circuit board
3: Adhesive layer

4: Electronic parts
5: Electrode
6: Anisotropy electrical conducting material

[Translation done.]